REMARKS/ARGUMENTS

STATUS OF THE APPLICATION

Claims 1-24 were pending in this application and examined.

Claims 3, 12, 15, and 24 are objected to as being dependent upon a rejected base claim, but are deemed allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

Claims 1, 2, 13, and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino et al., "Accurate Collision Response on Polygonal Meshes" [hereinafter "Volino_Accurate"] in view of Volino et al., "Collision and Self-Collision Detection: Efficient and Robust Solutions for Highly Deformable Surfaces" [hereinafter "Volino_Collision"]. Claims 5 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Yaeger (U.S. Patent 5,515,489) [hereinafter "Yaeger"]. Claims 4, 6, 16, and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Kommrusch et al. (U.S. Patent 5,444,838) [hereinafter "Kommrusch"]. Claims 7, 9, 19, and 21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Rossignac et al., "Interactive Inspection of Solids: Cross-sections and Interferences" [hereinafter "Rossignac"]. Claims 8 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Rossignac and Jeff Lander "Skin Them Bones: Game Programming for the Web Generation" [hereinafter "Lander"]. Claims 10 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Lafleur et al., "Cloth Animation with Self-Collision Detection" [hereinafter "Lafleur"]. Claims 11 and 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Volino_Accurate in view of Volino_Collision and further in view of Lafleur and Kommrusch.

Applicants have amended claims 1-24. New claims 25-30 have been added. Applicants submit that no new subject matter has been introduced by the amendments. Claims 1-30 remain pending in this application after filing of this amendment.

THE SPECIFICATION

The specification has been amended to correct inadvertently introduced typographical errors. Applicants submit that no new subject matter has been introduced by the amendments.

THE CLAIMS

Rejections under 35 U.S.C. 103

Claim 1

Applicants submit that the features of the present invention recited in independent claim 1, as amended, are not made obvious by the cited references. Claim 1, as amended, recites:

> 1. A method of analyzing intersections between objects in computer animation comprising the steps of:
>
> . . .
>
> determining which vertices of said meshes are contained within said intersection path; and
>
> setting a polarity of each vertex contained within said intersection path to indicate that said vertex is contained within said intersection path, wherein a polarity of a vertex is set based upon a number of disconnected regions formed by said intersection path. (Applicants' claim 1, as amended, emphasis added).

As recited above, the polarity of each vertex contained within the intersection path is set based upon the number of disconnected regions formed by the intersection path. The setting of polarities for vertices based upon the number of regions formed by an intersection path is explained in the Application specification in paragraph [0041] on page 12. The specification states that

> If an intersection path arises from a situation as depicted in either Fig. 3b or Fig. 5b, then there are two such regions. Arbitrarily, the vertices in one region are assigned the "color" black, and the vertices in the other region are given the color white. If the intersection is a self-

> intersection that yields a single region, as in Fig. 6, then all the vertices in that one region are marked as having color red_i. A vertex is allowed to have an arbitrary number of colors. (Excerpt from paragraph [0041] on pg. 12)

Accordingly, various polarity values (e.g., "$white_i$" or "$black_i$", or "red_i") may be associated with a vertex based upon whether the intersection path forms a single connected region (as in Fig. 6) or multiple disconnected regions (as in Figs. 3b or Fig. 5b)--i.e., based upon the number of disconnected regions formed by the intersection path.

As described in the specification, the polarities associated with the vertices may be used in various different applications such as to simulate motion of objects in response to collisions (Specification: pgs. 14, 15), pinch detection (Specification: pgs. 15, 16), to determine correct orientation in motion simulation programs (Specification: pgs. 16, 17), etc.

Applicants submit that the above-described concept recited in claim 1 is not taught or suggested by the cited references, considered individually or in combination. Volino_Accurate teaches a general geometrical method for enforcing collisions. There is no teaching or suggestion of setting polarities for vertices within an intersection path based upon the number of disconnected regions formed by the intersection path. In fact, Volino_Accurate does not even attempt to identify the number of regions formed by an intersection path.

Volino_Collision also does not teach or suggest such a concept. Volino_Collision teaches an algorithm for detecting collisions, including self collisions, and techniques for evaluating collision inside-outside orientation. Volino_Collision provides techniques for determining if an element is at the correct side of a surface or at the other side (See Volino_Collision: Section 3 on pg. 7). The in-out orientation is updated according to the moves of the objects (See Volino_Collision: Section 3.1 on pg. 7).

Applicants submit that Volino_Collision also does not attempt to identify the number of regions formed by an intersection path. As a result, Volino_Collision also does not teach or suggest setting polarities for the vertices based upon the number of regions. Applicants submit that determination of the inside-outside orientation taught by Volino_Collision is not the same as setting polarities for the vertices as recited in claim 1 of the application. In

Volino_Collision, the "most probable" orientation for a collision region is determined by considering statistically the individual collision orientations. Then, the common collision orientation is given for every collision (See Volino_Collision: Section 3.2 on pgs. 8 and 9). Unlike the present invention recited in claim 1, there are no polarities set for the vertices in Volino_Collision can then used for various applications as described in the present application. Accordingly, the orientations set in Volino_Collision (either "correct side" or "other side") are not that same as polarities. Accordingly, Applicants respectfully submit that claim 1 as amended is not taught or suggested by Volino_Collision.

On the contrary, Applicants submit that the remnance techniques taught in Volino_Collision are similar to the prior art techniques described in the Application specification that make use of "history" (i.e., based upon past positions and orientations), rely on statistics, and take the majority vote to determine which side is the correct side for the cloth to be on (See Application specification pgs. 3 and 4, and Volino_Collision sections 3.0, 3.1, and 3.2). This is substantially different from the invention recited in claim 1.

Applicants thus submit that claim 1, as amended, is not taught or suggested by Volino_Collision.

Applicants further submit that other cited references (i.e., Yaeger, Kommrusch, Rossignac, Lander, and Lafleur) also fail to teach or suggest setting of polarities of vertices based upon the number of disconnected regions formed by an intersection path. Accordingly, Applicants submit that the cited references considered individually do not teach or suggest the invention as recited in claim 1. Further, even if the references were combined, the resultant combination would fail to teach such a concept as recited in claim 1.

Accordingly, Applicants submit that claim 1, as amended, is in a condition for allowance.

Claims 2-24

Applicants respectfully submit that claims 2-6 that depend from claim 1 should be allowed for at least a similar rationale as discussed above for allowing claim 1, and others.

Independent claims 7, 10, 13, 19, and 22 have been amended to include the feature of claim 1 described above. Accordingly, Applicants submit that claims 7, 10, 13, 19, and 22 should be allowed for at least a similar rationale as discussed above for allowing claim 1, and others. Dependent claims 8-9, 11-12, 14-18, 20-21, and 23-24 should be allowed for at least a similar rationale as discussed for allowing the independent claim from which they depend.

New Claims

Applicants submit that new claims 25-30 are also allowable. Claims 25 and 26 represent dependent claims corresponding to previously pending multiple dependent claims 6 and 18.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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